

Claim(s)

1. A method comprising:
 - capturing an image of a tissue microarray at a first magnification, the tissue microarray including a plurality of disks, each disk including a sample of a biological specimen;
 - 5 locating a first group of disks from the plurality of disks using one or more visual features of the first group of disks;
 - identifying a grid defined by the first group of disks;
 - locating a second group of disks from the plurality of disks using the identified 10 grid to locate disks which do not include the one or more visual features of the first group of disks;
 - capturing an image of each one of the first group of disks and the second group of disks at a second magnification; and
 - storing the captured images.
- 15 2. The method of claim 1 wherein identifying a grid comprises applying a Hough transformation to locate one or more gridlines having one or more intersections.
3. The method of claim 2 wherein locating a second group of disks comprises 20 selecting locations at the one or more intersections which do not include any of the first group of disks.
4. The method of claim 1 wherein locating the first group of disks comprises convolving the image of the tissue microarray with a disk template that includes the one 25 or more visual features.
5. The method of claim 1 further comprising quantitatively analyzing the captured images of each one of the first group of disks and the second group of disks to obtain quantitative data.

6. The method of claim 5 further comprising storing the location and the quantitative data for each one of the first group of disks and the second group of disks in a database.

7. The method of claim 6 further comprising providing access to the database over a network to one or more remote clients.

8. The method of claim 1 wherein capturing the image of the tissue microarray at the first magnification further comprises combining a plurality of images of a plurality of portions of the tissue microarray.

10

9. The method of claim 1 wherein a robotic microscope is employed to capture the image of the tissue microarray and to capture the image of each one of the first group of disks and the second group of disks.

15 10. The method of claim 1 wherein the robotic microscope is accessible over a network.

11. The method of claim 1 wherein the method is performed by a robotic microscope under control of a computer program without user intervention to autonomously capture

20 and archive magnified images of each disk in the tissue microarray.

12. The method of claim 11 further comprising autonomously analyzing each captured image and storing a result of each autonomous analysis.

25 13. The method of claim 1 wherein the one or more visual features include matching to a disk template.

14. A computer program product comprising:
computer executable code for controlling an imaging device to capture an image
30 of a tissue microarray at a first magnification, the tissue microarray including a plurality

of disks, each disk including a sample of a biological specimen;

computer executable code for locating a first group of disks from the plurality of disks using one or more visual features of the first group of disks;

computer executable code for identifying a grid defined by the first group of disks;

5 computer executable code for locating a second group of disks from the plurality of disks using the identified grid to locate disks which do not include the one or more visual features of the first group of disks;

computer executable code for controlling the imaging device to capture an image of each one of the first group of disks and the second group of disks at a second

10 magnification; and

computer executable code for storing the captured images.

15. The computer program product of claim 14 wherein identifying a grid comprises applying a Hough transformation to locate one or more gridlines having one or more

15 intersections.

16. The computer program product of claim 15 wherein locating a second group of disks comprises selecting locations at the one or more intersections which do not include any of the first group of disks.

20

17. The computer program product of claim 14 wherein locating the first group of disks comprises convolving the image of the tissue microarray with a disk template that includes the one or more visual features.

25

18. The computer program product of claim 14 further comprising computer executable code for quantitatively analyzing the captured images of each one of the first group of disks and the second group of disks to obtain quantitative data.

30

19. The method of claim 18 further comprising computer executable code for storing the location and the quantitative data for each one of the first group of disks and the

second group of disks in a database.

20. The method of claim 14 wherein the imaging device is a robotic microscope.

5 21. A system comprising:

capturing means for capturing an image of a tissue microarray at a first magnification, the tissue microarray including a plurality of disks, each disk including a sample of a biological specimen;

10 first locating means for locating a first group of disks from the plurality of disks using one or more visual features of the first group of disks;

identifying means for identifying a grid defined by the first group of disks;

second locating means for locating a second group of disks from the plurality of disks using the identified grid to locate disks which do not include the one or more visual features of the first group of disks;

15 the capturing means further for capturing an image of each one of the first group of disks and the second group of disks at a second magnification; and

storing means for storing the captured images.

22. A system comprising an imaging device and a computer, the imaging device responsive to control signals to provide images at a specified magnification and a specified location within a tissue microarray, and the computer providing the control signals to the imaging device and receiving the images provided by the imaging device, the computer configured to locate a first group of disks on the tissue microarray within an image of the tissue microarray captured at a first magnification by applying a convolution of the image of the tissue microarray with a template, and the computer further configured to locate a second group of disks on the tissue microarray within the image of the tissue microarray using the coordinates of a grid obtained from the first group of disks.

30 23. The system of claim 22 wherein the computer communicates with the imaging

device through a local area network.

24. The system of claim 22 wherein the computer communicates with the imaging device through an internetwork.

5

25. The system of claim 22 wherein the computer includes a voice-activated command system for receiving and processing user input.

26. The system of claim 22 further comprising a database for storing, for each disk of
10 the first group of disks and the second group of disks, an image of the disk, a location of the disk, and a quantitative analysis of the disk.

27. The system of claim 26 wherein the database is accessible from one or more remote computers through an internetwork.

15